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10/623,679

07/22/2003

Koji Nozaki

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07/10/2006

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP
1250 CONNECTICUT AVENUE, NW
SUITE 700
WASHINGTON, DC 20036

EXAMINER

WALKE, AMANDA C

ART UNIT

PAPER NUMBER

1752

DATE MAILED: 07/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/623,679

Applicant(s)

NOZAKI ET AL.

Examiner

Amanda C. Walke

Art Unit

1752

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3 and 5-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishibashi et al (6,579,657) in view of Kanda et al (JP 2001-019860 in view of its English language abstract).

Ishibashi teaches a method for manufacturing a semiconductor device: A first resist pattern is formed from a first resist (a mixture of *novolac resin* and a naphthoquinonediazide photosensitive agent) on a semiconductor base layer. A second resist is formed on the first resist pattern which generates crosslinking reaction in the presence of an acid. A crosslinked film is formed at a portion of the second resist contacting with the first resist pattern by the agency of an acid fed from the first resist pattern. Non-crosslinked portions of the second resist are removed (i.e., developed) to form a second resist pattern. Finally, the semiconductor base layer is subjected to etching through the second resist pattern used as a mask. Ishibashi teaches (see col.2, lines 31-38, lines 62-65) as the second resist material, a fine pattern-forming material, which is a *mixture of water-soluble* resin such as polyvinyl alcohol or polyvinyl acetal and a crosslinking agent such as a melamine derivative or a urea derivative.

Ishibashi teaches (col.9, lines 6-12) that in order to improve the film-forming properties, surface active agents such as non-ionic polyoxyethylene nonylphenyl ether type surfactant can be

Art Unit: 1752

added to the second resist material. Ishibashi teaches (col.7, lines 34-50) that as his *water-soluble* resin for the second resist, polyacrylic acid, polyvinyl acetal, polyvinylpyrrolidone, polyvinyl alcohol, polyethyleneimine, polyethylene oxide, styrene-maleic acid copolymer, polyvinylamine resin, polyallylamine, oxazoline group-containing resists, water-soluble melamine resins, water-soluble urea resins, alkyd resins, and sulfone amide resins can be used and that the water-soluble resins may be used singly or *in combination of two or more*.

Therefore, it would have been obvious to one of ordinary skill in the art to use the combination of polyvinyl acetal (or polyvinyl alcohol) and styrene-maleic acid copolymer as Ishibashi's water soluble resin for the second resist with a reasonable expectation of obtaining a material for finely isolated resist patterns capable of reducing an isolation size or hole size in the pattern when the resist pattern is formed in a semiconductor manufacturing process. Since the styrene-maleic acid copolymer is water soluble aromatic compound as well as a resin containing an aromatic compound in a portion thereof, Ishibashi meets the instant claim limitations. Ishibashi teaches that non-ionic surfactants may be employed, but fails to specifically teach the instantly claimed non-ionic surfactants.

Kanda et al disclose a resin composition having non-ionic surfactants, and teaches that suitable non-ionic surfactants include ethoxylated alcohols such as those instantly claimed in combination with water as a solvent, therefore it would have been obvious to one of ordinary skill in the art to prepare the material of Ishibashi et al choosing to employ the surfactant of Kanda et al as the non-ionic surfactant with reasonable expectation of achieving a material for forming a fine pattern.

Response to Arguments

3. Applicant's arguments filed 2/28/2006, with respect to the rejection(s) of claim(s) 1-28 under 102 (Ishibashi) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Kanda et al.

4. Applicant's arguments/ amendments filed 2/28/2006, with respect to Suetsugu have been fully considered and are persuasive. The rejection of claims 1-22 has been withdrawn.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amanda C. Walke whose telephone number is 571-272-1337. The examiner can normally be reached on M-R 5:30-4.

Art Unit: 1752

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Amanda C Walke
Primary Examiner
Art Unit 1752

May 9, 2006